vascular tension relaxes. Evidently, then, the congestion of these veins encircling the glandular outlets must close the latter and prevent the escape of their contents. The watery secretion of the first stage we could account for by transudation directly from the bloodvessels through the areolar tissue and the surface epithelium.

The contraction of the smooth muscle-fibres and of the elastic fibres of the stroma contributes to the collapse of the venous sinuses, the gateways of the radical veins being opened by the contraction of the encroaching arterioles. An expression of the glandular contents also follows, subsidence of the engorgement of the superficial veins having opened the mouths of the glands.

THE VALUE OF OPHTHALMOSCOPIC CORNEAL IMAGES.

By Ernest E. Maddox, M.D.,
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In my previous paper on this subject it is said that the corneal reflection maps out with very fair precision the point of the cornea which is traversed by the visual axis.

This is true enough for practice, but requires qualification from a scientific point of view, for the precision is not absolute, and it remains to set the discrepancy on a definite basis.

The symmetry of the eyeball, though for a living organ truly marvellous, is not perfect, since the centres of curvature of its media are not in a mathematically straight line; yet they are sufficiently so to allow us to speak of an "axis of symmetry," in, or close to which each centre resides. The two extremities of this "optic axis" are the anterior and posterior poles of the eye, of which the former is the "summit," or mid-point of the cornea, a point equidistant from opposite parts of its circumference.

Before proceeding further, the shape of the cornea will require a little consideration. Its horizontal diameter is greater than its vertical, and even when free from astigmatism its shape is very peculiar, being evidently adapted to abolish spherical aberration. It is generally described as an "ellipsoid of revolution," the long axis of which is tilted at a slight angle with the optic axis.

Sulzer,[1] however, has shown, by very careful measurements, that we may consider the cornea for a considerable area around the visual axis as approximately spherical, while only outside this area does it become ellipsoidal, and increasingly so toward the periphery. Since, in the methods of using corneal images which I have advocated, the centre of the ophthalmoscopic mirror is always made the point of fixation for the patient, the corneal reflection takes place quite close to the visual axis, and therefore within the area which is spoken of by Sulzer as spherical.

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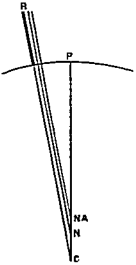
[1] La forme de la cornée humaine, 1892.

We may feel quite free, therefore, without danger of appreciable error, to regard the portion of the cornea concerned in our test as if it were an absolutely spherical convex mirror, with a radius of curvature of about 7.8 mm.

Since the focal length of every convex mirror is half its radius of curvature, the principal focus of the cornea lies nearly 4 mm. behind its anterior surface, or almost exactly in the plane of the pupil. The corneal image is, of course, a virtual one, since the light does not really reach it, but is only reflected from the cornea as if it came from it.



Now let us imagine two straight lines, one (shown in the figure as C R) drawn from the centre of curvature (C) of the cornea, and the other drawn from N, which is the anterior nodal point; both meeting in the eye of the surgeon, and therefore nearly parallel. The first (C R) is the line which determines the position of the bright reflection from the cornea; it is around this line that the corneal image lies, at a distance of. about 4 mm. behind the anterior surface of the cornea, and it, of course, coincides with the surgeon's visual axis when he looks at the corneal reflection. The other line, from N, is the patient's visual axis. Were the anterior nodal point and the centre of curvature of the cornea to coincide, the two lines proceeding from them would also coincide.

In that case the corneal reflection would map out the patient's visual axis with absolute precision. But, in fact, they do not coincide, as shown in the figure, the anterior nodal point being only 6.968 mm. behind the cornea when accommodation is negative, and further forward still when accommodation is positive. When, as sometimes occurs in high myopia, the patient's visual axis coincides with his optic axis, then the line of the corneal reflection also coincides with both, and the corneal reflection itself occupies the exact mid-point of the cornea. Under these circumstances alone does the corneal image exactly indicate the part of the cornea traversed by the visual axis. Under all other conditions the corneal image *exaggerates* the inclination of the visual axis by a definite ratio, the amount of which depends on the relative distance, behind the anterior surface of the cornea, of the anterior nodal point and of the centre of curvature.

The ratio between these two distances is, with negative accommodation, as 8 to 9, and with the fullest possible accommodation, as 5 to 6.

In the figure, N represents the nodal point in negative accommodation, and N A the same nodal point with fullest possible accommodation, and the lines drawn from each show that the exaggeration is greater during full than during negative accommodation. The corneal reflection, therefore, exaggerates the obliquity of the visual axis by at least one-eighth as much again. This, however, is very slight, and, being regular and in perfect ratio, only suits our purpose for clinical use all the better.

TUBERCULAR TUMORS OF THE LARYNX.

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It is not my intention in this paper to discuss the usual manifestations of phthisis laryngis. Tubercular infiltrations of the epiglottis, the arytenoids, and the inter-arytenoid space, and the masses of granulation-tissue often resembling papilloma springing from tubercular ulcerations are characteristic appearances familiar to all who have occasion to examine the larynx frequently. These appearances, although they may be considered in a sense tumors, do not come under the title as it is here applied. Tubercular disease of the larynx appears, very rarely, to manifest itself in the form of smooth, rounded tumors, single or multiple, or in the form of papillomatous growths which are found, on microscopic examination, to consist of tubercular tissue containing generally the bacilli of tuberculosis, and accompanied often by no or only slight manifestations of pulmonary tuberculosis. All such cases, as far as I know, which have been published I shall briefly review, bringing out only the important points, report a case of my own, and endeavor to draw some conclusions which may be of value.

As early as 1866 Tobold appears to have recognized the existence of tubercular growths of the larynx, although Ariza (1877) is generally considered as having been the first to call attention to them. In the